

complete (column 3, lines 22-35). These steps are quite different from those of the present invention.

Further, the product obtained in the present invention is a mixed carotenoid product containing lutein-fatty acid ester as a main component. On the other hand, as apparent from the above saponification, the product obtained in Madhavi et al. is a mixed carotenoid product containing as a main component a lutein obtained from hydrolysis of a lutein-fatty acid ester. The claimed method for producing a lutein-fatty acid ester is unobvious from the reference method for producing a lutein.

As recognized by the Examiner, Madhavi et al. fail to disclose or suggest the step of the claimed invention of dissolving the marigold oleoresin in a ketone solvent. The Examiner relies upon Kanel et al. as teaching this step. The Examiner argues that Kanel et al. teach solvent extraction of luteins and other carotenoids from plant material by a multi-step solvent extraction process in which supercritical fluids such as supercritical carbon dioxide and organic solvents and diluents such as ketone solvent acetones are employed. The Examiner further argues that it would have been obvious to one of ordinary skill in the art to have modified the processes of Madhavi et al. by substituting or supplementing the solvent extraction steps with a solvent extraction step employing an organic solvent such as acetone, since the combination of supercritical fluids and class of solvents including at least acetone are shown to enhance the phase transfer and complete recovery of the desired solutes into the extraction solvent phase.

It is respectfully submitted that the Examiner's reasoning is untenable.

The method according to the present invention consists of the combination of (1) a step of subjecting oleoresin to supercritical fluid extraction and (2) a step of dissolving the oleoresin in a ketone solvent, and thereafter (3) cooling the solution and (4) removing the ingredient which precipitated in the solution. Although either step (1) or (2) may be carried out first, preferably the step of subjecting oleoresin to supercritical fluid extraction is carried out first followed by a step of dissolving the extract in a ketone solvent. Please see the paragraph bridging pages 9-10 of the specification.

Kanel et al. is simply directed to a method for supercritical fluid extraction of a substance including carotenoids. Kanel et al. simply teaches that an acetone or numerous other solvents may be included in the supercritical fluid extraction. Kanel et al. fails to disclose or suggest a separate step of dissolving any material such as carotenoids in a ketone solvent, either before or after the step of supercritical fluid extraction.

The Examiner has failed to point out any teaching in the cited references which would have motivated one of ordinary skill in the art to perform this additional separate step according to the claimed invention. At best, the teachings of Kanel et al. would have solely motivated one of ordinary skill in the art to perform the optional supercritical extraction described in Madhavi et al. according to the method of Kanel et al.

In addition, the Examiner's reasoning that the subject matter of claims 2 and 18-23, i.e. a high lutein content of as much as 46%, are taught by Kanel et al. at Table 1 and at least 50% by Madhavi et al. at column 3, lines 62-65 is not correct.

As is clear from the disclosure of Example 1a of Kanel et al., the numerical value of 46% shown in Table 1 represents an amount of the total carotenoids in the extracts from *Dunaliella salina*. The total carotenoids include α -carotene, trans- β -carotene, cis- β -carotene, β -cryptoxanthin, lutein and zeaxanthin according to Example 1a. Thus, "46%" does not mean the content of lutein-fatty acid ester of the present invention.

The numerical value "at least 50%", as described in column 3, lines 62-65 of Madhavi et al. means the content of lutein, and does not mean the content of lutein-fatty acid ester.

The Madhavi et al. disclosure states "one weight part of the oleoresin is dissolved in excess (e.g., 2-3 volume parts) of the solvent" in column 3, lines 16-18. Thus the free flowing solution of marigold oleoresin in column 3, line 15 means that an isopropanol solution of marigold oleoresin is prepared. On the other hand, the viscosity in "low viscosity" of the present invention means the viscosity of marigold oleoresin itself, and is not the viscosity of the solution of marigold oleoresin in organic solvent.

In view of the foregoing, it is respectfully submitted that the claimed method is not suggested but is patentable over the cited references.

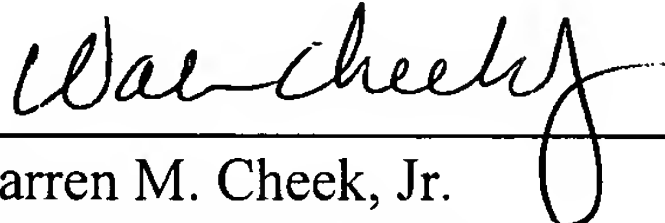
Lastly, claim 14 is rejected under 35 USC 103 as unpatentable over Madhavi et al., Kanel et al. and Runge. This ground of rejection is respectfully traversed.

Claim 14 of the present invention is not obvious to a person skilled in the art, even if the teachings of Madhavi et al., Kanel et al. and Runge et al. are combined, because the teachings of Runge fail to remedy the deficiencies of the primary references to Madhavi et al. and Kanel et al.

In view of the foregoing, it is believed that each ground of rejection set forth in the Official Action has been overcome, and that the application is now in condition for allowance. Accordingly, such allowance is solicited.

Respectfully submitted,

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